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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,081	06/20/2000	Denis Toullier	Q59763	6081

7590

04/23/2003

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EXAMINER

SEDIGHIAN, REZA

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/597,081

Applicant(s)

TOULLIER ET AL.

Examiner

M. R. Sedighian

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "the highest rank circulator" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 4-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark (US patent No: 6,041,152).

Regarding claim 1, Clark teaches a system for injecting into a fiber (col. 2, lines 57-67, col. 3, lines 1-2) signals from multiple sources (4, 5, 8, 9, fig. 5) at different wavelengths (col. 8, lines 5-10, 18-20 and λ_1 , λ_2 , λ_3 , λ_4), the system comprising: a first signal source (9, fig. 5), a first circulator (80, fig. 5) with a first input (the input port 83 of circulator 80) connected to the first source (9, fig. 5), a second signal source (5, fig. 5), a second circulator (81, fig. 5) with a first input (the input port 85 of circulator 81) connected to the second signal source (5, fig. 5) via reflector means (93, fig. 5) for reflecting signals (col. 8, lines 10-18) from the first source (note that the signal wavelength λ_2 of 1541 nm enters circulator 81 at port 88 and then it is reflected

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by Bragg grating 93 at port 85), a second input (port 89 of circulator 81) supplying the signals from the first and second signal source (col. 8, line 23, note that the signal from source 9 that is reflected by grating 93 and the signal from source 5, all are supplied to port 89 of circulator 81), and a third input (port 88 of circulator 81) connected to a second input (port 87 of circulator 80) of the first circulator (80, fig. 5).

Regarding claim 4, Clark teaches the signal sources (9, 5, fig. 5) comprises a pump (each light transmitter 9 and 5 can be considered as a pump source, since each source transmits or pumps respective wavelengths of 1541 nm and 1557 nm into the respective circulators 80 and 81).

Regarding claim 5, Clark teaches the reflector means (93, fig. 5) comprise Bragg gratings (col. 8, lines 19, 22).

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark (US patent No: 6,041,152).

Regarding claims 2-3, Clark differs from the claimed invention in that Clark does not disclose a third signal source and a third circulator and reflector means, and an nth signal source and an nth circulator with reflector means. Clark discloses both number of channels and/or the number of circulators may be varied to accommodate different number of channels (col. 8, lines

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30-32). Clark further teaches the number of channels provided for in the basic components may be freely varied depending on system requirements as may be the wavelengths of the channels carried, and any of the illustrated gratings may be replaced by other types of gratings or the like (col. 8, lines 50-55) and additional gratings may be added anywhere in the system (col. 8, lines 58-59). Accordingly, it would have been obvious to incorporate a third circulator, a third signal source, and a third reflector means in the transmission system of Clark. For example, a third circulator with configuration similar to circulator 81, can be connected to the output port 89 of circulator 81, and such circulator can have a first port, a second port, and a third port, wherein the first port can be connected to the third source with a reflector means between the first port and the third source, the second port can receive the signals from the third source and signals received from circulator 81, and the third port that can be connected to the second port of circulator 81 (for example it can be connected to port 89 of circulator 81). Note that the signals that can be received by this third circulator, from circulator 81 can be reflected by a third reflector means such as a Bragg grating located between the first port and the third source of the third circulator. Furthermore, a similar arrangement can be provided for an nth circulator that can be connected to an nth signal source with an nth reflector means connected between the nth source and the first port of the nth circulator. One of the ordinary skill in the art would have been motivated to incorporate optical circulators and Bragg gratings in an optical transmission system in order to add and drop a plurality of different optical signals. Therefore, it would have been obvious to an artisan at the time of invention to add additional signal sources, circulators, and Bragg gratings in the optical transmission system of Clark in order to drop a particular

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channel, or to add a new channel to provide additional transmission or isolations for different optical signals and to increase the transmission capacity of the system.

7. Claim 6-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark (US patent No: 6,041,152) in view of Grasso et al. (US patent No: 6,288,810).

Regarding claims 6-7 and 10, as it is understood in view of above 112 problem, Clark discloses an optical transmission system (col. 8, lines 5-10 and fig. 5) as discussed above in claim 1. Clark differs from the claimed invention in that Clark does not disclose an amplifier fiber connected to the second output of the second circulator. Grasso, from the same field of endeavor, teaches an optical transmission system (fig. 1) that is comprised of a plurality of optical circulator (7A, 91, 92, 7B, fig. 1) and a plurality of optical line amplifiers (col. 6, lines 24-44, col. 7, lines 6-7 and 5A, 5B, 93, 94, fig. 1 and fig. 3). One of the ordinary skill in the art would have been motivated to incorporate optical amplifiers along the optical transmission lines in order to boost the light signals that become attenuated during the transmission and to increase the transmission distance. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate an optical amplifier such as amplifier 5A of Grasso along the transmission line, or along the second output of the second circulator in the transmission system of Clark in order to boost the signals to desired level and to improve the overall transmission performance. It is notoriously known that optical amplifiers can be placed anywhere along the transmission path in an optical system to boost the signal and to restore the signal to a desired level. As to claim 7, Grasso teaches the amplifier fiber (5A, fig. 1) is a line fiber (col. 6, lines 25-35, col. 7, lines 6-7 and 32, fig. 3).

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8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark (US patent No: 6,041,152) in view of Grasso et al. (US patent No: 6,288,810) and in further view of Shibuya (US patent No: 5,652,675), or Pan (US patent No: 5,81,712).

Regarding claim 8, the combination Clark and Grasso differs from the claimed invention in that Clark and Grasso do not disclose the amplifier is not a line fiber. Shibuya teaches an optical transmission system (fig. 4) that is comprised of optical circulators (8, 13, fig. 4) that are connected to optical amplifiers (col. 7, lines 48-63 and 42, 43, fig. 4). Shibuya further teaches the optical amplification has semiconductor laser modules in place of Er ion-doped optical fibers (col. 7, lines 48-51). Likewise, Pan teaches an optical semiconductor amplifier (30, fig. 6) that is connected to an optical circulator (32, fig. 6). One of the ordinary skill in the art would have been motivated to incorporate optical amplifiers along the optical transmission lines in order to boost the light signals and to increase the total transmission distance. Therefore, it would have been obvious to an artisan at the time of invention to incorporate a semiconductor optical amplifier such as the ones of Shibuya, or Pan for the amplification stage in the modified optical transmission system of Clark and Grasso in order to boost the signals to desired level and to improve the overall transmission performance.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark (US patent No: 6,041,152) in view of Grasso et al. (US patent No: 6,288,810) and in further view of Kerfoot, III et al. (US patent No: 6,320,884).

Regarding claim 9, the combination Clark and Grasso differs from the claimed invention in that Clark and Grasso do not disclose the amplification is effected in the amplifier fiber by

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Stimulated Raman Scattering. Kerfoot teaches a method of Raman amplification based on

Stimulated Raman Scattering (col. 1, lines 24-42, col. 2, lines 63-67, col. 3, lines 1-24).

Stimulated Raman Scattering amplification is advantageous because it can provide better signal amplification and it permits longer fiber span while introducing less noise. Therefore, it would have been obvious to an artisan at the time of invention to incorporate a method of Raman amplification such as the one of Kerfoot for the amplification stage in the modified optical transmission system of Clark and Grasso in order to provide a broad bandwidth optical amplifier with a wide amplification range to achieve transmission of high capacity optical signals.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

m. R. Sedighian
Mohammed Sedighian
Patent Examiner
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